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REPORT

50X1-HUM

CD NO.

COUNTRY USSR

DATE OF  
INFORMATION 1916 - 1952

SUBJECT Economic - Technological, coal-mining machinery

DATE DIST. 29 Jul 1952

HOW  
PUBLISHED Statistical yearbooks; bimonthly, monthly,  
and biweekly periodicalsWHERE  
PUBLISHED Moscow

NO. OF PAGES 5

DATE  
PUBLISHED 1935 - Feb 1952

LANGUAGE Russian

SUPPLEMENT TO  
REPORT NO.

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SOURCE Yearbooks and periodicals as indicated.

MECHANIZATION OF USSR COAL INDUSTRY AT HIGH LEVEL

This report gives information on mechanization of the USSR coal  
 industry and figures on USSR production of coal-mining machinery,  
 taken from yearbooks and periodicals as indicated.

Sotsialisticheskoye Stroitel'stvo SSSR, Statisticheskii Yezhegodnik, TsSU Gosplana,  
 Soyuzgornuchet, Moscow, 1935

The following table lists the park of Soviet coal cutters and pick hammers  
 as of the beginning of the indicated years.

	1928 - 1929	1930	1931	1932	1933	1934
Heavy cutting machines	549	761	1,007	1,278	1,473	1,679
Light cutting machines	268	393	409	322	339	294
Pick hammers	71	1,272	3,322	6,190	9,020	10,764

Sotsialisticheskoye Stroitel'stvo SSSR 1935 - 1938, Statisticheskii Shornik,  
 Gosplanizdat, Moscow, Leningrad, 1939

At the end of 1933 there were 1,679 heavy coal cutters on hand in the Soviet  
 Union. It was anticipated that there would be 2,509 on hand at the end of 1938.

Moscow, Planovoye Khozyaystvo, Mar - Apr 46

During the entire prerevolutionary period, only about 40 coal-cutting machines  
 were imported into the Donbas from foreign firms. All other coal-mining mechanisms  
 also had to be imported, since the Russian coal industry at that time produced no  
 machines for extracting coal or developing mines. Such strides were made during  
 the five-year plans, however, that by 1940 the extraction of coal was 94.8 percent  
 mechanized, moving from the face was 90.4 percent mechanized, and hauling out  
 (measured in ton-kilometers) was 75.2 percent mechanized.

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Before the [Second World] war Soviet coal-mining machinery plants put out over 1,000 cutting machines, about 2,000 conveyers, over 3,000 conveyer drives, about 19,000 pick hammers, and 11,000 hammer drills.

During the war, despite the destruction of the main southern machine-building plants of the coal industry, mechanization of basic processes in the eastern coal fields increased. Production of electric mine locomotives was rapidly established in eastern plants, and hauling out on main lines was mechanized 92.4 percent in 1945.

The [large-diameter] holing drill was applied extensively in the Kuzbass during the war. These machines performed the formerly difficult and dangerous work of advancing new workings. In the Podmoskovnyi coal fields, the shaker conveyer was completely replaced by the scraper conveyer. Many other new machines were developed during the war, and the Donbass has been nearly restored to its prewar mechanization level.

The program of mechanization laid out in the [postwar] Five-Year Plan demands that the park of coal-industry mechanisms be increased three to four times in comparison with the prewar period. The machine-building plants of the Ministry of the Coal Industry of the Eastern and Western Regions alone are to produce over 11,000 cutting machines, 1,600 mine hoists and winches, 33,000 scraper and belt conveyers, about 13,000 centrifugal pumps, 4,900 electric locomotives, and 565,000 mine cars.

Series production of hundreds of powerful cutting machines having an hourly motor capacity of 45 to 55 kilowatts is now being established, while in the next 2 years of the Five-Year Plan, cutting machines having 70- to 100-kilowatt-capacity motors will be produced. Production of short-wall and universal cutting machines, which can be used for development work, has already been established. Among additional machines to be produced during the 5-year period are cutter loaders, various types of combines, and loading machines.

It is planned to replace shaker conveyers with scraper conveyers, broadening the application of conveyer systems reaching directly along the working face. Ten- and 14-ton locomotives will replace 6- and 7-ton machines in hauling-out operations. Large-capacity mine cars (2 to 5 tons) will be introduced.

Another facet of the current plan is the increase of the machine-building centers of the coal industry. 13 new machine-building plants will be put into operation, and 16 existing plants will be restored and rebuilt.

Between 1946 and 1950 it is planned to build 271 concentrating plants, having a yearly capacity of 175 million tons of coal. Six plants, having a capacity of 9 million tons per year, will be restored; and 26 briquetting plants with a yearly capacity of 10 million tons of briquettes will be built. A machine-building center for concentrating equipment will be created, and two new machine-building plants will be built in the Kuzbass and the Donbass.

Moscow, Ugoi', Nov 47

Before World War II, the mines of the Donbass were using over 2,600 heavy cutting machines, about 13,000 pneumatic hammer drills and pick hammers, 6,200 conveyers, and 1,300 electric locomotives.

In 1937, mechanized coal cutting amounted to 89.6 percent of all extraction methods in the USSR; in the US mechanized cutting accounted for 77 percent of the entire extraction; in Germany the figure was 84.7 percent; in Britain 51 percent.

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In the year 1928 - 1929, the Gorlovka Plant produced only 11 cutting machines: in 1935, the plant put out 435. During the same period, the Leningrad Pnevmatika Plant increased its production of pick hammers from 29 to 8,648.

The number of cutting machines in the Donbass increased from 530 in 1929 to 1,737 at the end of 1937.

Extraction of coal at the face is mechanized either through preliminary undercutting with cutting machines, or without undercutting, using pick hammers or explosives. The extent to which the various means of mechanized extraction at the face were developed in three coal fields at the end of 1937 is shown in the following table.

	<u>Heavy Cutting Machines</u>	<u>Light Cutting Machines</u>	<u>Pick Hammers</u>	<u>Blasting</u>	<u>Total</u>
Donbass	64.6	0.9	18.3	5.1	88.9
Kuzbass	12.3	0.1	7.5	73.0	92.9
Mosbass	20.8	0.4	46.5	15.0	82.7

Growth in the mechanization of three phases of the entire extraction process in Soviet mines is shown in the table below.

	<u>Cutting (zarubka)</u>	<u>Moving From Face</u>	<u>Hauling Out</u>
1932	65.4	46.5	15.0
1937	89.6	84.4 (including gravity method)	47.6
1940	94.8	90.4	75.2

At the beginning of 1940, 58 percent of the hauling-out operations in the Donbass were performed by electric locomotives.

Moscow, Mekhanizatsiya Trudoyemkikh i Tyazhelykh Rabot, Sep 50

As compared to 1946, production of coal combines in 1950 is increasing 24 times; of rock loaders, 4.2 times; and of electric mine locomotives, 2.1 times.

Moscow, Ugol', Jan 50

In 1948, the mechanization of coal extraction had considerably surpassed the prewar level. In September 1949, the mechanization level of basic extraction processes had achieved the following percentages: undercutting and breaking, 98.2 percent; conveying from coal-yielding faces, 99.1 percent; hauling out on main lines, 92.3 percent; loading coal into railroad cars, 98.8 percent.

Moscow, Ugol', Nov 50

Cutting and breaking of coal have been mechanized 98.5 percent; conveying from coal-yielding faces, 99.4 percent; hauling out on main lines, 97.8 percent; loading into railroad cars, 99.3 percent.

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Moscow, Ugol', Jan 51

Loading of coal at the face is being mechanized, with the present level at 20 percent of full mechanization. The Donbass combine is the main machine effecting mechanized loading under conditions to which the machine is adaptable.

Complex mechanization of Soviet coal mines can be achieved only if underground transportation is changed radically. To effect this change the mines must take the following measures: establish unbroken conveyer lines as the basic transport medium in the coal-extraction sections; double the present number of sections served by conveyers; and revamp the railroad system, replacing light rails with heavier ones, and laying them on gravel beds, so that new 10-14 ton locomotives can be used widely.

To mechanize maneuvering operations, small 2-ton combined battery and contact locomotives and condenser-type electric locomotives will have to be used extensively. The mechanization level for maneuvering operations must be raised to 80 percent in the next 3 to 4 years.

To increase the speed of advance in development work, more efficient drills and more powerful explosives must be used, and group drilling of blast holes must be applied. In addition, loading of coal and rock must be performed by machine. This process must be 85 percent mechanized in new mines within the next 2 to 3 years. Moving material from the face must be 100 percent mechanized in the advancing of horizontal shafts.

Moscow, Ugol', Apr 51

The loading of coal and rock in the advancing of main horizontal workings is now 35 percent mechanized.

Moscow, Ugol', Aug 51

In 1950, mechanization of loading at the face in flat pitching seams was brought up to 33 percent in the Kuzbass, and to 24.9 percent in the Karaganda coal fields.

Moscow, Mekhanizatsiya Trudoyemkikh i Tyazhelykh Raket, Aug 51

At the end of 1950, there were over 300 coal combines and over 1,000 coal- and rock-loading machines at work in Soviet coal mines.

Moscow, Ugol', Jan 52

In 1951, the available park of modern machines and mechanisms for the Soviet coal industry increased considerably. As compared to the 1940 figure, the number of cutting machines increased 20 percent; of pick hammers and hammer drills 80 percent; of conveyers (all types) 140 percent; of scraper conveyers, nine times; of electric locomotives, nearly four times; and of loading machines for development work, 70 times.

In recent years, almost the entire range of types of mine machines has been renewed. Machines and mechanisms of prewar design are no longer produced in coal machinery plants.

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Broad application of coal combines made it possible to increase the volume of mechanized coal loading in 1951 to 1½ times the 1950 figure, and to raise the mechanization level in loading from sloping and inclined seams to 22 percent.

The 1951 productivity of combines increased 15 percent over that of 1950.

At the end of 1951, the scraper conveyers at the faces constituted 90 percent of the over-all conveyor park.

Changes have been made in the underground transportation systems. Ten- and 14-ton electric locomotives now make up about 25 percent of all operating electric locomotives. Condenser-type locomotives, running on a single-phase current of normal frequency, were used for the first time in the world in Soviet mines. The park of large-capacity cars has been increased considerably.

During 1951, machine-building plants of the Ministry of the Coal Industry turned out over 100 experimental groups and models of new machines and mechanisms. Among these are the Gornyak combine, a combine for working steep pitching seams, and the SKR-17 scraper conveyor.

The same year saw considerable strides in the mechanization of loading operations in digging vertical shafts. Shafts were equipped with ECh-1 pneumatic loaders, the number of which was increased to 250.

In 1952, the level of mechanization for loading coal and rock in advancing development workings must be raised. Productivity of loading machines must be increased sharply. More combines for development work are needed to bring up the mechanization of this phase of mining. Several types of development combines were in use in 1951.

Besides new machines, Soviet mines during 1952 will receive series-produced, modernized EPM-1, PPM-2 (improved versions of the UMP) machines, and PML-5 pneumatic loading machines, all for development work.

In 1952, a program will be launched to put intermediate transportation on a complete conveyor basis. Winches and car feeders will be applied widely in underground transportation, with the aim of bringing the mechanization of maneuvering operations up to 75 percent of the total. There will be increased utilization of signaling and blocking.

Moscow, Bol'shevik, No 3, Feb 52

Soviet mines are well equipped with machines mechanizing the loading of coal and rock in development work. Soviet designers have developed four types of loading machines, all now in series production. Over 1,500 of these loading machines are in operation.

Before the war, the shaker conveyor was the only device used in moving coal from the face. During the postwar Five-Year Plan, several new types of scraper conveyers were put out, suitable for use in various kinds of coal deposits.

Mechanization of cutting (zarubka), breaking (otboyka), moving from the face, hauling out, and loading into railroad cars has been completed. The amount of coal mechanically loaded from the face amounts to one fifth of all the coal extracted from sloping and steep dipping seams.

Electric locomotives transport [haul out] about 90 percent of all coal taken from the mines.

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